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Research

My main research since 1985 has been on galectins. I was part of discovering and naming this protein family, the first to describe the detailed carbohydrate binding specificity of ga-lectins and show that it could differ between members of the family, discovering and clon-ing new members, key collaborator on early structural biology of galectins (first X-ray crys-tal structure of a galectin-2 1993, and structures of galectin-10 1995 and galectin-3 1998, first NMR assignment of a galectin 2001 and other studies). Besides the above, my own research on galectins has focused on defining their carbohydrate binding specificity re-garding mechanism and biological roles in cell culture, and their binding to serum glycopro-teins and its relationship to function and disease. This included demonstrating polarized non-classical secretion for the first time (1993), differential intracellular sorting of two ga-lectins, and differential trafficking based on carbohydrate fine specificity. The last ~15 years, I have collaborated with organic chemist Ulf Nilsson to develop potent galectin in-hibitors and we have achieved compounds with low nM monovalent affinities, which is among the highest ever observed for a carbohydrate binding protein. We have also gen-erated a library of fluorescent saccharide probe to be used in a fluorescence anisotropy assay to test affinities, which is unique in the galectin field. With this we have clearly demonstrated the ability of galectins for high affinity (submicromolar) monovalent interac-tions, thereby challenging the old view that protein-carbohydrates are weak and require multivalency for high affinity. Recently we have begun to use these tools to study the func-tion of galectins in cell culture and to try to develop therapeutics against cancer, inflamma-tion and fibrosis. For the latter a company, Galecto Biotech AB, was founded with others in 2011 (see below).

Before starting on galectins, my research was focused on glycosphingolipids (my PhD top-ic), regarding isolation and structure determination, and their role as microbial receptors. Highlights were that our group were pioneers in mass spectrometry of complex carbohy-drates. In addition, with a colleague I discovered the first role of a specific glycosphin-golipid as a bacterial adhesion receptor, specifically globoside acting as receptor for uro-pathogenic E.coli (cited 500 times). Because of this I have been consulted for advice and collaboration in the fields of mass spectrometry of glycoconjugates, and microbial adhe-sion for many years after.

Clinical

In Lund I has worked part time as doctor in clinical immunology from 1997 – 2015. I was also chairman of Clinical Immunology in Swedish Medical Association (Läkarsällskapet) from 2004 – 2012, and took part in defining new criteria for the specialty and preparing fusing with Transfusion Medicine. Before I had some shorter clinical appointments and AT in Göteborg. In USA I was formally Professor of Psychiatry and took part in teaching doc-tor-patient relationships for first year medical students.

Business.

In Lund part of my research has been collaboration with Ulf Nilsson in Organic chemistry to develop inhibitors of galectins. This has led to possibility for drug development, and therefore a company founded, Galecto Biotech. This has now reached phase 2a studies that were completed 2017, and published 2020. A phase 2b study started 2019 treatment of idiopathic lung fibrosis. In addition, other drug pipelines are explored. The company has won the trust of funders, and so is very well funded at the moment. It has now grown to close to 30 employees and been listed on NASDAQ (as Galecto Inc.). I am a consultant advisor with the company now.